



March 14, 2013

Tab Tesnau
USEPA
1200 Pennsylvania Ave NW
Ariel Rios Bldg: Mailcode 5303P
Washington DC
20460-5303P

Dear Tab,

Per our phone conversation and emails, VEXOR Technology is submitting a revised request for a letter of comfort regarding VEXOR Engineered Fuel® (VEF) for determination of qualification as a non-waste fuel under the Non Hazardous Secondary Material (NHSM) rule. The description and supporting data supersedes the previous information provided including the original letter dated October, 2011, clarification dated January 25, 2012 and response to questions dated September 4, 2012 per our February 7, 2013 email and phone conversation.

VEXOR Technology, Inc. operates non-hazardous facilities that process wastes (industrial and commercial wastes and other pre-processed materials that cannot be further recycled) into VEF for use as an alternative to coal. The processing operation at VEXOR is completely indoors which helps to ensure that the environment, our employees, the community and our customers are protected. During the last 10 years of operations, VEXOR has developed a new product of VEXOR Engineered Fuel® as an alternative to coal. The VEF is a manufactured product with a commercial application in a combustion unit where coal is burned, such as a cement kiln, lime kiln or utility boiler. Industrial and commercial wastes are utilized as raw materials in the manufacturing process. These materials include but are not limited to plant debris from industrial sources that have been segregated for processing into VEF. This material is accepted after a sustainability audit is conducted at the generator site and the material approved as part of the normal approval process as found in the VEXOR approval plan. Examples include paper bags, oily or waxy cardboard, coated plastics or other hard to recycle or un-recyclable materials. Some examples of other industrial waste include carbon, oil and oil sludge, resins, soy based inks, polyols, waxes, sawdust, diaper tailings and absorbents. No fluorine containing wastes are accepted for VEF. Oils are tested to ensure they are not mixed with halogenated solvents via the initial approval, test kits and outside lab analysis. If halogens are detected and a rebuttal is not offered, these are rejected back to the generator or to an alternate facility for proper disposal. Oils with high levels of rebuttable halogens are not included in the VEF due to the low halogen specification of the fuel. The industrial wastes that meet the specification for the VEF are used as raw materials to enhance BTU's and improve the fuel characteristics. VEXOR also utilizes processed ReEngineered Feedstock in the VEF manufacturing process. This material has been

processed to remove the recyclables including PVC, plastics, paper, metals (both ferrous and non-ferrous) and cardboard at recycling facilities. The remaining material has value as a BTU source but cannot be further recycled and is used as a raw material for VEF. VEXOR does not accept “black bag” waste from the general public. The overall VEF product is manufactured to meet the specification of the fuel per the end user’s needs.

Processing:

The processing of wastes into VEF involves the following steps:

All materials are approved prior to acceptance following a state approved plan. This process also ensures that none of the materials utilized in the manufacturing of VEF is a hazardous waste. Each material is characterized and evaluated based on a number of parameters to determine if it can be utilized as a raw material for VEF. This approval process is reviewed following strict procedures as listed in the plan. The evaluation of the contaminant levels, BTU’s and other requirements are tailored to the individual specifications contractually agreed to by the customers of the VEF. (For example, a utility boiler would have different specifications than cement or lime kilns since the cement or lime kiln may need certain compounds or chemicals that may be deficient in their raw materials or coal that is vital to the chemical makeup of the product they are manufacturing, i.e. cement or lime.) All inbound wastes and materials are sampled and tested following the approved plan for fingerprint analysis to verify the waste compared to the approval. Non-hazardous wastes that do not fit into the VEF are processed for proper disposal or may be returned to back to the generator or alternate disposal sites for proper processing or disposal. VEXOR employs rigorous procedures for the selection of wastes and other materials to process to achieve the specifications for the end user kiln based on parameter testing including BTU’s, ash content, sulfur, halogen, and mercury among others identified by kiln operations and air emissions. Certain materials are removed such as metals, inorganic materials, and other materials not able to support combustion or are not beneficial to the product being made (cement or lime). Mixing and processing recipes are followed to achieve the end goal, a specification driven commodity along with particle size reduction to ensure complete combustion in the firing zone. Additions of materials to enhance combustion or for the beneficial use to the kiln are added if needed during the process based on QA/QC testing. Testing is done during and after mixing, and after particle size reduction to ensure the VEF adheres to the strict specification for combustion and performance at the kiln. Quality controlled product with specification analytical is provided for each load as delivered as with any other product or fuel used at a kiln or power plant. Ash from the combustion of VEF is incorporated into the final product, i.e. the cement or lime dust, and adds a positive contribution to the final product. Ash analysis is performed on the VEF to ensure compatibility.

Once the VEF is mixed and blended via process recipe, the VEF is then processed via a production operation utilizing shredders fed by conveyor systems with head magnets and overhead magnets used to remove metal contamination from the VEF. Large pieces of materials that do not have BTU value are removed prior to mixing and during the conveyor feeding process via a visual sorting and hand removal process. The initial shredder reduces the particle size to assist in proper mixing and blending and the associated conveyor with head magnet

removes coarse metals. The second shredder further reduces particle size and feeds to the final shredder via conveyors with overhead magnets and head magnets. These remove any metals that remain in the VEF. The final shredder takes the VEF to a two dimensional particle size of <30mm. Homogeneity is achieved by the proper characterization of the waste used to manufacture the fuel, strict adherence to the manufacturing recipe along with the QA/QC done to approve the waste for acceptance and once it is received into the facility. The mixing and shredding allow for a product with consistent and uniform appearance, chemical makeup and combustion characterizations.

Legitimacy Criteria

VEF meets the legitimacy criteria as a non-waste fuel under the NHSM rule as follows:

Under 40CFR 241.3(d)(1), the legitimacy criteria for fuels include: 1) management of the material as a valuable commodity based on the following factors – storage prior to use must not exceed reasonable time frames, and management of the material must be in the manner consistent with an analogous fuel, or where there is no analogous fuel, adequately contained to prevent releases to the environment; 2) the material must have a meaningful heating value and be used as a fuel in a combustion unit that recovers energy; and 3) the material must contain contaminants at levels comparable to or less than those in traditional fuels which the combustion unit is designed to burn.

Manage as a Valuable Commodity

VEXOR intends to manufacture upwards of 200,000 tons per year of VEF for a kiln location which would have a quick turnaround on inventory. Typical inventory at the manufacturing site will be up to a week of burn time for VEF. Storage at the kiln is for a reasonable time frame as well. The kilns are using VEF as a supplement to coal and can afford to only have a working storage capacity, typically 3-7 days of burn time. This equates to storage of upwards to 1,000 tons depending on the amount of VEF the kiln is using, typically up to 6 tons per hour but can go up to 20 tons per hour based on the number of kilns per location, the amount of coal burned per kiln and the substitution rate of VEF to coal. This is a much shorter time frame than traditional coal pile storage at a kiln where the coal piles may be on site for months if not years. The use of VEF requires additional capital and equipment for the kiln to properly store, convey and combust the VEF. This capital improvement includes the storage and conveyance system to move the VEF from the storage to the burner floor. This can only be achieved by a covered storage system. Storage is also under cover to prevent releases to the environment along with keeping the fuel up to the specifications. The BTU value will suffer if moisture is absorbed from rain or snow exposure to the outdoor open storage therefore covered storage is required. An MSDS for VEF is included in Attachment 1: VEF Specification, MSDS

Meaningful Heating Value and Used as a fuel to Recover Energy

Testing has been done on VEF to show that it has a meaningful BTU value. This value can range depending on the kiln and where the VEF is being introduced. Typically this would be in the range of 6,000 to greater than 130,000 BTU/pound. When combusting VEF in the hot zone

of a kiln or at a lime kiln, the heating value is typically around 10,000 BTU/pound whereas for a pre-calciner cement kilns the BTU could be around 6,000 BTU/pound. Regardless of the type of kiln, the BTU value would be considered a "meaningful heating value" and therefore meet the requirements of the legitimacy criteria for a non-waste fuel. Specification ranges for VEF are attached to this document as Attachment 2: VEF analytical.

Comparability of Contaminant Levels

All levels of contaminants are within the range of the traditional fuel, i.e. coal. Also, fluorine is not found in VEF due to the fact that any waste containing fluorine is not approved for the VEF program. VEXOR has also modified the specification sheet for VEF to reflect the maximums for the contaminants that could be found in VEF. Typically these contaminants are lower than the specification on average. These upper cap limits are all within the range of the contaminants found in the comparison chart for traditional fuel, i.e. coal. Again, if any of these caps are exceeded during production, testing, or final QA/QC for the product, the VEF is reworked to meet the specification or is removed and disposed of as a waste and not shipped to be combusted as a fuel. All VEF shipped for combustion will fall within the specifications and therefore have contaminant levels equal to or less than coal. All of the contaminants fall within range of the published Contaminant Concentrations in Traditional Fuels for coal thereby meeting the legitimacy criteria of having equal or lesser contamination than the fuel the unit is designed to burn. Attachment 2: VEF analytical is attached showing the contaminant levels of VEF as tested.

Conclusion

VEF has been tested and approved for use in multiple states and at multiple operations including cement and lime kilns. VEXOR has a vast amount of experience in non-hazardous processing, QA/QC and manufacturing of a specification driven product with viable alternative energy value. VEXOR is requesting a Regulatory Clarification or "comfort letter" of the VEXOR Engineered Fuel® to show that this is a non-waste fuel under the Non-Hazardous Secondary Material rule. VEF is a commodity, purchased as a fuel for use as a fuel in a manufacturing process. Because VEF is specification driven product, sufficiently processed, it is our opinion that VEF meets the legitimacy criteria and is a non-waste fuel.

Sincerely,



Patrick Oberth
Energy, Compliance and Technical Manager
VEXOR Technology, Inc.

ATTACHMENT 1: VEF SPECIFICATION AND MSDS

VEXOR Engineered Fuel (VEF)

Material Specification

<u>Component</u>	<u>Unit</u>	<u>Specification</u>
Heating Value	Kj / Kg	20,900 - 27,850 Range (25,765 - 26,700 Target)
	BTU / lb.	6,000 - 13,000 Range 11,100 - 11,500 Target
Sulfur Content	Wt. %	1.0 Maximum
Chlorine	Wt %	0.5 Maximum
Fluorine	mg/kg	0
Ash	Wt %	10.0 Maximum
Moisture	Wt %	5-15% Range,
Particle Size	Diameter - Inches	0-2 Range,

METALS:

Arsenic	mg/kg (ppm)	< 5 Maximum
Cadmium	"	< 2 Maximum
Chromium (Total)	"	< 20 Maximum
Chromium (VI)	"	< 1 Maximum
Lead	"	< 25 Maximum
Mercury	"	< 2 Maximum
Antimony	"	< 6.8 Maximum
Beryllium	"	< 5 Maximum
Cobalt	"	< 20 Maximum
Manganese		
Nickel	"	< 100 Maximum
PCBs	"	< 5 Maximum

OTHER:

Biomass	Wt %	20 Minimum
Nitrogen	Wt %	3.5 Maximum

Material Safety Data Sheet

May be used to comply with

OSHA's Hazard Communication Standard,
29 CFR 1910.1200. This Standard must be
consulted for specific requirements.

U.S. Department of Labor

Occupational Safety and Health

Administration

(Non-Mandatory Form)

Form Approved

OMB No. 1218-0072

IDENTITY <i>VEXOR Engineered Fuel (VEF)</i>	Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.
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Section I

Manufacturer's Name: VEXOR Technology, Inc.	Emergency Telephone Number 877-721-9773
Address: 955 W. Smith Rd.	Telephone Number for Information 877-721-9773
Medina, OH 44256	Date Prepared 7/18/06
	Signature of Preparer <i>(optional)</i>

Section II - Hazard Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% <i>(optional)</i>
No hazardous components				
Absorbents (sawdust, paper, cardboard, diaper tailings)				20-30
ReEngineered Feedstock: unrecyclable plastic, paper, cardboard that has been sorted to remove PVC, glass and metal and recyclables				40-80
Oily waste including rubber processing oils and debris including spill pads and absorbents – no halogens				5-10
Off spec chemical products and intermediates with no HAP compounds or halogens				10-20
Resins, polyols, adhesives, waxes –with no HAP compounds				10-20
Soy based inks and ink sludges				10-20

INDUSTRIAL BY-PRODUCTS PROCESSING AND RECYCLING

Vexor Technology • 955 West Smith Road, Medina, OH 44256 • Office: 877.721.9773 • Fax: 330.721.9438 • www.VexorTechnology.com

Carbon black and carbon filter media				5-20
Shredded plastics, paper and cardboard goods				0-20

Section III - Physical/Chemical Characteristics

Boiling Point	N/A	Specific Gravity (H ₂ O = 1)	0.7
Vapor Pressure (mm Hg.)	N/A	Melting Point	N/A
Vapor Density (AIR = 1)	N/A	Evaporation Rate (Butyl Acetate = 1)	N/A
Solubility in Water N/A			
Appearance and Odor Brownish/black solid with little to mild odor with particle size of less than ½"			

Section IV - Fire and Explosion Hazard Data

Flash Point (Method Used) >200 F	Flammable Limits N/A	LEL N/A	UEL N/A
Extinguishing Media Foam or water			
Special Fire Fighting Procedures Wear self contained breathing apparatus			
Unusual Fire and Explosion Hazards None			

Section V - Reactivity Data

Stability	Unstable		Conditions to Avoid
	Stable	X	N/A
Incompatibility (<i>Materials to Avoid</i>) Avoid oxidizers due to material being organic			
Hazardous Decomposition or Byproducts N/A			

Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	N/A

Section VI - Health Hazard Data

Route(s) of Entry:	Inhalation? Not expected	Skin? Not expected	Ingestion? Not expected
Health Hazards (<i>Acute and Chronic</i>)			
None known			
Carcinogenicity: N/A	NTP? N/A	IARC Monographs? N/A	OSHA Regulated? N/A
Signs and Symptoms of Exposure N/A			
Medical Conditions Generally Aggravated by Exposure			
Emergency and First Aid Procedures Wash any exposed skin with soap and water.			

Section VII - Precautions for Safe Handling and Use

Steps to Be Taken in Case Material is Released or Spilled Absorb any liquid with sawdust. Sweep up and place in container for disposal.
Waste Disposal Method material can be disposed of in a licensed landfill or can be burned at an incinerator with appropriate scrubbers.

Precautions to Be taken in Handling and Storing N/A
Other Precautions N/A

Section VIII - Control Measures

Respiratory Protection (<i>Specify Type</i>) <i>Not required</i>		
Ventilation	Local Exhaust: Should be adequate	Special
	Mechanical (<i>General</i>) <i>N/A</i>	Other

Protective Gloves: Rubber gloves	Eye Protection: Safety glasses or goggles
Other Protective Clothing or Equipment Long sleeve shirts, long pants	
Work/Hygienic Practices Always wash hands or any other exposed skin after handling.	

Section IX - Special Precautions

Precautions to be taken in Handling and Storing N/A
Other Precautions

Each MSDS must be reviewed for correctness and completeness every three years.

Reviewed by Patrick Oberth Reviewed by _____

Revision date January 24, 2012 Revision date _____

ATTACHMENT 2: VEF ANALYTICAL

VEF	Prod	BTU	Cl	Sb	As	Be	Cd	Cr	Co	Pb	Mn	Hg	Ni	Se	S
Batch	Date	btu/lb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppm	ppm	ppm
1169	10/7/11	10198	1118	3.64	2.79	0.00	0.00	2.97	0.73	10.34	5.36	60.4	0.00	1.96	1375
1170	10/10/11	10361	1231	4.96	2.17	0.14	0.36	2.60	3.52	9.69	11.42	36.0	0.00	0.74	1485
1171	10/11/11	9812	1097	2.33	0.92	0.00	0.14	3.21	1.77	10.53	7.06	14.7	0.00	0.00	1833
1172	10/12/11	9974	1639	3.45	0.94	0.16	0.00	2.08	1.64	10.42	2.02	15.4	0.00	0.00	1575
1173	10/14/11	9923	1551	2.30	0.78	0.00	0.24	2.06	2.41	9.35	1.71	20.4	0.00	1.92	1125
1174	10/18/11	10158	1151	3.60	1.37	0.08	0.00	2.14	1.19	10.60	3.51	0.0	0.00	2.07	1510
1175	10/19/11	10384	1093	2.41	0.12	0.06	0.00	1.29	0.89	9.76	1.08	13.5	0.63	1.02	1700
1176	10/20/11	9104	1405	1.73	2.83	0.00	0.00	1.06	1.87	10.76	1.75	0.0	0.00	0.29	1275
1177	10/21/11	9877	1224	5.77	1.74	0.00	0.00	3.28	2.87	10.52	1.01	4.4	0.00	2.01	1625
1178	10/25/11	9785	1666	6.49	0.49	0.00	0.00	2.22	2.00	5.23	2.20	0.0	0.00	0.85	1677
1179	11/2/11	9558	1917	2.03	0.61	0.00	0.00	2.52	2.48	7.69	1.28	6.4	0.00	0.77	1250
1180	11/3/11	9491	1058	0.00	0.83	0.00	0.00	1.51	0.75	6.17	1.86	61.5	0.00	0.74	1700
1181	11/4/11	9525	1584	0.00	2.04	0.79	0.00	1.25	1.87	8.85	1.85	22.4	0.86	2.08	1700
1182	11/7/11	9491	1450	1.65	2.55	0.00	0.12	2.95	2.57	10.25	3.43	34.9	0.00	1.60	1700
1183	11/8/11	9708	1265	3.08	0.67	0.00	0.00	1.89	0.98	10.31	4.91	10.2	0.00	1.84	1563
1184	11/11/11	9666	1086	2.18	1.96	0.10	0.32	3.11	0.09	5.40	10.67	0.0	0.00	0.00	1315
1185	11/14/11	9563	1227	0.59	2.35	0.15	0.00	5.61	0.87	9.07	9.20	42.6	0.09	2.60	1550
1186	11/16/11	9814	1330	2.38	0.00	0.00	0.00	1.97	3.66	11.76	2.43	110.4	0.00	0.83	1125
1187	11/30/11	9703	901	0.00	0.00	0.00	0.00	6.42	1.65	15.34	7.59	0.0	5.63	1.27	1500
1188	12/1/11	9617	1836	3.40	2.34	1.28	0.00	4.45	0.10	14.01	6.24	50.4	4.86	1.16	1575
1189	12/2/11	9890	1242	3.61	4.16	0.00	0.00	3.57	4.11	9.48	13.66	26.4	3.89	0.88	1550
1190	12/6/11	10335	1364	6.30	1.65	1.68	1.62	6.94	2.93	9.21	10.09	69.1	2.53	2.05	2063
1191	12/7/11	10510	1253	3.39	2.75	1.20	0.00	4.83	0.80	11.34	8.39	44.0	4.46	1.40	1988
1192	12/8/11	10267	1305	5.50	1.56	1.36	1.48	6.98	2.89	3.38	13.34	0.0	2.32	0.00	1500
1193	12/9/11	9985	1493	6.56	4.78	3.57	0.22	3.28	2.56	9.54	12.30	49.8	1.07	2.63	1775
1194	12/12/11	10117	1560	3.23	1.33	0.91	0.00	5.82	1.93	8.08	3.12	12.4	1.63	1.32	1813
1195	12/13/11	9915	1788	4.24	1.50	3.27	0.00	5.22	1.49	9.86	9.58	18.0	0.00	1.63	1250
1196	12/14/11	10040	1320	3.39	0.00	0.00	0.00	2.51	1.19	6.67	17.13	109.4	3.04	1.48	1625
1197	12/22/11	10796	1164	3.43	3.48	1.25	1.07	2.60	2.67	12.19	11.27	94.5	0.56	0.50	1638
1198	12/28/11	10092	1469	0.69	0.00	0.00	0.00	1.48	0.52	8.91	5.08	152.8	3.66	2.67	1625
1199	1/3/11	9866	1159	5.03	1.34	1.81	0.00	1.25	3.36	7.12	8.08	38.4	3.21	0.67	1600
Ave.		9920	1353	3.14	1.61	0.57	0.18	3.20	1.88	9.41	6.41	36.1	1.24	1.26	1567
Note:	Mercury Detection Limit: 1.0 ppb. A zero indicates below detection limit.														
Note:	All other metal Detection Limits: 0.04 ppm. A zero indicates below detection limit.														

INDUSTRIAL BY-PRODUCTS PROCESSING AND RECYCLING